

except that no actual fusion of the renal portions of the two cardinals takes place. On the other hand, the state of things in *Protopterus* more nearly resembles that seen in Howes's figure<sup>1</sup> of the venous system of a Frog in which the left azygos was retained, as already mentioned.

A more complete description and detailed figures of the venous system of *Protopterus* I reserve until later; I have brought forward the above points in the present connection in order to make clear my former indefinite statement on the subject, and because they seem to me to be important with regard to the question of the homology of the veins throughout the Vertebrata, which is now engaging much attention. The facts I have mentioned are only some out of a great number which go to prove that a near connection must have existed between the ancestors of the Dipnoi and those of the Amphibia after they had diverged from a common piscine type, for the resemblances between the existing forms of both groups are in many respects exceedingly close. Nevertheless, certain points in the structure of the Dipnoi, more especially that of their fins, show that no *direct* relationship can exist between them and the Amphibia at the present day.

4. Notes on some Fishes new to the Australian Fauna. By  
J. DOUGLAS OGILBY, F.L.S. (Communicated by Dr. F.  
DAY, F.Z.S.)

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The present paper contains detailed descriptions of three species of fishes new to the Australian subregion, inclusive of Lord Howe Island; these are *Anthias cichlops*, *A. pleurotaenia*, and *Scorpaena cookii*, not one of which appears to be well known to naturalists. I also give notes on a species of *Platystethus* from the above-mentioned island, pointing out differences which may prove to be of specific value; but owing to my limited knowledge of the genus I am loath to describe it as new; however, I append a synopsis of the known species for comparison. Finally I give a description, taken from four specimens, of the life-colours of a species of *Chærops*, which I take to be *C. omnopterus*.

ANTHIAS CICHLOPS, Blk.

B. vii. D. 10/16 A. 3/7. V. 1/5. P. 18. C. 15. L. l. 50.  
L. tr. 6/14<sup>2</sup>.

The length of the head equals the height of the body, and is two ninths of the total length. The diameter of the eye is contained thrice and two fifths in the length of the head; the snout, which is very obtuse, is three fourths of the diameter of the eye, while the interorbital space, which is almost flat, is equal to the same. The

<sup>1</sup> *Loc. supr. cit.*

<sup>2</sup> Counting obliquely backwards from the first dorsal spine.

dorsal profile, from the tip of the snout to the origin of the caudal fin, forms a graceful and gradual curve, which is more abrupt on the head than on the body; the ventral profile is flat from the isthmus to the origin of the anal fin, behind which there is a gentle ascent. The lower jaw projects slightly beyond the upper when the mouth is closed. The cleft of the mouth is very oblique; the maxilla reaches to beneath the posterior edge of the pupil of the eye; it is exceedingly broad, being no less than three fifths of the diameter of the eye at its hinder margin, while the breadth of the preorbital bears a similar proportion to it. The nostril is provided with two openings, the posterior of which is situated on the anterior margin of the eye, on a line with the upper edge of the pupil, and is of moderate size and round, while the anterior, which is placed midway between the eye and the tip of the snout on a slightly lower level, is oval and very minute. The opercle is armed with three spines, of which the middle is much the longest, while the upper is so small as to be difficult of detection; the vertical limb of the preopercle is finely serrated, and three or four of the teeth on the rounded angle are much larger and stronger than the others; the horizontal limb is entire. *Teeth*—there are one or two small canines on the front of each ramus of either jaw, between which are patches of small teeth, separated by a naked space at the symphysis; behind the canines are small cardiform teeth in a double row anteriorly, but posteriorly in a single row, where, in the lower jaw, they are distinctly longer: the vomerine teeth form a triangular patch, the palatine a narrow band; the tongue is toothless. *Fins*—the dorsal fin commences above the base of the middle opercular spine; the spinous portion is much lower than the soft, and its base is about one tenth shorter; the spines are slender, and the variation in length is very slight, the last being the longest, and two and three fourths in the length of the head; the intervening membrane is deeply notched, and is without a filiform appendage; the soft portion increases gradually in length to the thirteenth ray, beyond which it descends rather abruptly; the longest ray is one half longer than the last spine. The third anal spine is the longest, but little shorter than the last dorsal, while its rays are much longer than those of that fin<sup>1</sup>. The ventral spine is one third longer than that of the anal, and the second ray, which is the longest, reaches only to the vent, and is four fifths of the length of the head. The pectoral fin is elongate and pointed, reaching to opposite the origin of the anal, and equal in length to the head. The caudal fin is deeply forked, with equally developed lobes, none of the rays of which are elongate; its length is just one fourth of the total. *Scales*—of moderate size, finely ctenoid, and firmly adherent; the basal half at least of all the fins is scaly, and the entire head is covered with scales, smaller, especially on the snout, than those of the body. The *lateral line* has a long, gentle curve parallel to the line of the back. *Colours*—head and anterior half of the body rose-coloured, with a narrow, pale blue line running from

<sup>1</sup> In our specimen the fourth and fifth (Bleeker's longest, *vide* figure in Atl. Ichth. t. vii. pl. xi. fig. 1) rays are broken off close to the base.

the eye to the base of the ventral fin; remainder of the body and the fins, with the exception of the spinous dorsal, which is crimson, golden; irides purple, with an inner ring of gold.

On carefully comparing this description with that of Dr. Bleeker, we find that the following important differences occur:—(1) the arrangement of the teeth in the jaws, which can by no exercise of ingenuity be stated to be "*dentibus pluriseriatis*;" (2) the absence of a lateral canine in the lower jaw; (3) the absence of denticulations on the sub- and interopercles; (4) the greater number of scales on both lateral and transverse lines, and especially that between the former and the origin of the dorsal fin, which Bleeker computes at two or three, while in our example six are plainly visible; (5) the deep notching of the interspinous membrane; (6) the shortness of the ventral fins and the non-prolongation of the outer ray of each lobe of the caudal fin as shown in Dr. Bleeker's figure, characters which, however, may possibly be sexual; and (7) the greater length of the third anal spine than the second. Regarding the length of the ventral fins, if we turn to the figure in the 'Atlas Ichthyologique' (tome vii. Perc. tab. xi. fig. 1) we find by measurement that the elongate second ray reaches exactly to the origin of the anal fin, and not to the posterior anal rays—"radio secundo producto radios anales posteriores attingente"—as stated in the letterpress; on the other hand, however, we see a vast difference in the height of the first dorsal spine, which is delineated as but little more than half the height of the second, and barely two fifths of that of the third, whereas in our example the variation in length is hardly recognizable. Notwithstanding, however, the apparent importance of these differences, we cannot consider it desirable to describe as new a fish which otherwise agrees so accurately with the original diagnosis, especially when the coloration, so far as we know, unique in this genus, is exactly similar in the two known specimens.

Our example measures three and four fifths inches, and is therefore about three fifths of an inch smaller than Dr. Bleeker's type. It was obtained last April on Lord Howe Island by Mr. E. H. Saunders, who found it dead, but quite fresh and perfect, on the beach, and the colours given are those jotted down on the spot by that gentleman.

*ANTHIAS PLEUROTÆNIA*, Blk.

B. vii. D. 10/17-18. A. 3/7. V. 1/5. P. 18. C. 15.  
L. l. 48-49. L. tr. 6/18.

The length of the head is from four and two thirds to four and seven eighths the height of the body, three and a half times in the total length. The diameter of the eye is contained three and three fourths times in the length of the head; the snout is very obtuse and measures five sevenths of the diameter of the eye, while the interorbital space, which is strongly convex, slightly exceeds the same. The dorsal profile is much more curved than in the preceding species, but the ventral curve is very much the same; the upper surface of the head is obliquely straight. The lower jaw projects

slightly beyond the upper, and the cleft of the mouth is very oblique; the maxilla reaches to the posterior fourth of the orbit in one example, while in the other it only extends to beneath the middle of the eye; it is very much dilated posteriorly, its greatest breadth being five sixths of the diameter of the eye, while it is twice as broad as the preorbital. The nostril is provided with two openings placed close together, the posterior of which is very much the larger. The opercle is armed with three spines, of which the middle is much the longest, and the upper so completely hidden as to be difficult to find; the vertical limb and angle of the preopercle are evenly serrated, the horizontal limb being entire. *Teeth*—there are two or three small canines in front of each ramus of the lower jaw, and one or two much longer and stronger lateral ones, while between and behind these is a broad band of villiform teeth; in the upper jaw there are two canines in front of each ramus, one placed behind the other, the inner being much the stronger, and there is a row of stout cardiform teeth outside the villiform band; the vomer is furnished with a triangular patch, and the palatines with a narrow band of minute teeth, the tongue being smooth. *Fins*—the dorsal commences above the middle of the opercle; the spines are rather weak; the first four sevenths of the length of the second, which is about three fifths of that of the elongated third spine; the remaining ones are subequal in length, and not so high as the rays, some of which, near the end of the fin, exceed even the third spine; the base of the spinous is slightly less than that of the soft portion of the fin, and the interspinal membrane is but little notched and possesses a short filiform appendage. The third anal spine is the longest, rather less than one half of the length of the head, while its anterior rays are produced, so as to be three eighths longer than the longest dorsal ray, thus causing its outer edge to be deeply concave. The ventral spine is one fourth longer than the third anal, and the second ray is greatly prolonged, reaching, when entire, to the end of the base of the anal fin, and being one and a half times the length of the head. The pectoral fin is rather pointed, reaches to opposite the vent, and is equal in length to the head. The caudal fin is deeply forked, with the outer rays of each lobe filiform, and its length is three and two fifths in the total. *Scales*—of moderate size, finely ctenoid, and firmly adherent; the soft dorsal and anal fins are set in scaly sheaths, and, along with the other fins, are covered with smaller scales upon their basal half, and the entire head is clothed with scales of less size than those of the body. The *lateral line* has a gradual curve parallel to the line of the back. *Colours*—reddish brown, the fins with a yellowish tinge, especially on the outer half; a curved silvery (pale blue in life) streak runs from the cheek to the base of the caudal fin, near and parallel to the ventral profile, while a second is present, but not so strongly marked, from behind the base of the pectoral to that of the caudal fin<sup>1</sup>.

<sup>1</sup> Both these lines have entirely disappeared in my specimens, which have been two years in spirit.

Dr. Bleeker having described his species from a single specimen, a redescription taken from two perfect examples is interesting; a comparison of the two diagnoses, however, reveals but slight differences, such as the larger number of pectoral rays in my specimens, a slight variation in the comparative measurements, and fewer scales on the lateral line<sup>1</sup>. Dr. Bleeker's type, which came from Amboyna, was of rather smaller size than those here described, which measure respectively five and a half and five and two thirds inches. For the possession of these specimens the Australian Museum is indebted to the liberality of Lieut. Roche, late of H.M.S. 'Opal,' who obtained them on the Great Barrier Reef off the north-eastern coast of Australia.

*SCORPÆNA COOKII*, Günth.

B. vii. D. 12/9. A. 3/5. V. 1/5. P. 6/11<sup>2</sup>. C. 13.  
L. l. 62-65.

The length of the head is from twice and two thirds to twice and four fifths in the total length, the height of the body from three and three fifths to four times in the same. The eye is of moderate size, and is placed high up on the side of the head; its diameter is from two ninths to one fifth of the length of the head, from five sixths to two thirds of that of the snout, and from five eighths to one half of a diameter apart. The interorbital space is deeply concave, and is furnished with a median ridge, which springs from two roots on the posterior margin of the swelling caused by the intermaxillary processes, and ends opposite to the anterior third of the eye, from which point two low lateral ridges run backwards, and bending towards each other after leaving the interorbital fossa, meet in an acute angle on the posterior third of the occiput, and are there lost without terminating in a spine; there is a naked shallow groove below the eye. The cleft of the mouth is large and but little oblique, and the lower jaw protrudes slightly beyond the upper; the maxilla reaches to the vertical from the hinder margin of the eye, and even beyond it in large examples. The opercle is armed with two long and moderately strong spines of equal size: there are five spines on the preopercle, the uppermost of which is much the longest and strongest, while the two lower are short and blunt. The outer edge of the preorbital bears several spinate points which radiate from a common centre, and is usually provided with two tentacles; there is also a strong turbinal spine, as well as one anterior and two posterior spines on the supraorbital ridge, which is either with or without tentacles, these when present being sometimes

<sup>1</sup> The difference in the number of scales between the spinous dorsal and the lateral line is caused by Dr. Bleeker having counted those beneath the middle of the fin, while I, adhering to my usual practice, have counted the oblique row from the base of the anterior spine.

<sup>2</sup> In one of my specimens there are ten dorsal and six anal rays, while the pectoral fins have on one side five branched and twelve simple rays, that on the other side adhering to the normal number; this example has also exceptionally long orbital tentacles, but differs in no wise else from the other examples.

bifid; there is also an occipital ridge armed with three strong spines, and a temporal ridge with four, the last of which marks the commencement of the lateral line, and between these two rows there is a single small spine posteriorly; beneath the infraorbital groove there is a spinate ridge terminating in the upper preopercular spine, and the clavicle bears a strong compressed spine pointing upwards and backwards. *Teeth*—both jaws are furnished with bands of villiform teeth, the inner row of which is much enlarged, especially on the mandible; there is an obtusely angular band of villiform teeth on the vomer, and a narrow band, reaching as far back as the angle of the mouth, on the palatines. *Fins*—the dorsal fin commences either opposite to or rather in front of the middle of the opercle; its spines are acute and moderately strong, the fourth the longest, but little longer than the third and fifth, and from twice and one third to twice and four fifths in the length of the head; the dorsal rays are subequal in height to the spines, while those of the anal are much longer: the anal fin commences beneath the first dorsal ray and ends beneath the eighth; its second spine is much stronger and longer than the third, and is equal to, or not much shorter than, the longest dorsal spine. The ventral fin is rounded, and reaches to, or a little beyond, the vent, and is five ninths of the length of the head; the pectoral fin is rounded, and reaches to beneath the base of the last dorsal spine; the two upper simple rays are subequal and longest, from two thirds to four sevenths of the length of the head; the caudal fin is slightly rounded, from two ninths to one fifth of the total length.

The *scales* are of small size, and there is an elongate patch of rather smaller ones extending from between the two lower opercular spines to the tip of the flap<sup>1</sup>. The *lateral line* bends abruptly downwards from its origin to beneath the middle of the spinous dorsal, behind which the curve is very gradual. The *colours* are similar to those in the figure given by Dr. Günther.

In the 'Journal des Museum Godeffroy' (Bd. ii. p. 78, Taf. 55), Dr. Günther describes as new and figures a species of *Scorpaena*, under the name of *S. cookii*, from a British Museum example originally brought from Raoul Island, an outlying rock in the Pacific belonging to the Kermadec Group; he mentions, however, that a fish obtained by Mr. Garrett from the Sandwich Islands is probably of the same species. During the month of September 1887, Messrs. Etheridge, Whitelegge, and Thorpe were sent by the Australian Museum, Sydney, to Lord Howe Island, where they spent three weeks, and, notwithstanding the inclemency of the weather during their stay, brought back, among other spoils, a small but valuable collection of fishes. Amongst these were eight specimens of a *Scorpaena*, which was distinguishable at a glance from the common Port Jackson forms, *S. cruenta* and *S. cardinalis*, and which I take to be Dr. Günther's species. Having therefore a good working series of specimens measuring from eight to over twelve inches in length,

<sup>1</sup> Neither this patch of scales nor the anterior curvature of the lateral line is shown in Dr. Günther's otherwise excellent figure.

and in so recent a condition<sup>1</sup>, I have thought it useful to draw up the above detailed description of this handsome species, the more so as its original describer appears to have seen but one specimen, and I am not aware of its having been noticed since. The species will probably hereafter be found to occur at Norfolk Island, and on the northern shores of New Zealand, and perhaps even on our own eastern coast. Among the Lord Howe islanders it is known as the "Sandy Bay Cod," and being abundant and voracious it is taken in large numbers by means of hand-lines both from boats and from the shore for use as food, for which it is greatly esteemed. In this it must differ much from the Australian forms, which are soft, watery, and tasteless.

Mr. Saunders also collected three specimens of a *Platystephus* at Lord Howe Island, which differ from Dr. Günther's description (Cat. ii. p. 391) in the following important particulars.

PLATYSTETHUS, sp. inc.

A. 3/27. L. l. 52. L. tr. 6/14.

The body is rather deeper, being thrice and three fourths in the total length; the orbit is much larger, being but thrice and one fourth in the length of the head, and one fifth longer than the snout; the maxillary reaches to the anterior fourth of the eye; the width of the interorbital space equals the diameter of the orbit. The fifth dorsal spine is the longest, one fourth of the length of the head; the pectorals are rather short, measuring one seventh of the total, while the ventrals measure one thirteenth<sup>2</sup> of the same. The colour of the upper part of the head and body is deep blue, each scale being ornamented with a wavy silvery mark; the remainder of the body and head is silvery; the dorsal, pectoral, and caudal fins are dusky, the anal and ventrals grey; irides brown above, golden below.

Though many of these differences may be due to the larger size of my specimens, which measure from ten to twelve and a half inches, it is certainly an anomaly to find the more adult fish possessed of eyes the comparative measurements of which are so much greater than those of smaller examples, the reverse being ordinarily the case. Should the differences enumerated above, and which are constant in my three specimens, be considered sufficient to entitle the large-eyed form to specific rank, I would suggest as a suitable name *Platystethus guentheri*, after the distinguished founder of the genus. In this case the following simple synopsis of the species may be of interest, while the generic diagnosis must be modified so far as to read "first dorsal continuous, with from eight to thirteen spines."

1. *Platystethus cultratus*. D. 8 | 1/24. A. 3/30. L. l. 60.

Eye moderate, two ninths of the length of the head. Maxilla reaches to anterior margin of orbit.

2. *Platystethus guentheri*. D. 8 | 1/24. A. 3/27. L. l. 52.

<sup>1</sup> The description was drawn up immediately after the return of Messrs. Etheridge and party.

<sup>2</sup> In the measurements given by Dr. Günther at the end of his description, he makes the lengths of the pectoral and ventral fins even shorter in comparison to the total length of the specimen than in my examples.

Eye large, four thirteenths of the length of the head. Maxilla reaches beyond the anterior margin of the orbit.

3. *Platystethus huttonii*<sup>1</sup>. D. 13/36. A. 3/32. L. 1. 90. Eye moderate, two ninths of the length of the head. Maxilla not extending to the front margin of the orbit<sup>2</sup>.

#### CHÆROPS OMMOPTERUS (Rich.).

During the month of June 1888, I obtained in the Sydney market three adult examples of a *Chærops* which I believe to be identical with Sir John Richardson's *C. ommopterus*; but on account of certain constant differences in the pattern of coloration, I append a description of the life-colours, all three examples being exactly similar in this respect. They were of large size, measuring respectively nineteen, twenty, and twenty-four inches, and came from the Clarence River, New South Wales, this being the first recorded instance of the occurrence of the species within the colony, and extending its range southward by many degrees. The only difference, besides the coloration, between Dr. Günther's description and my specimens is that in the latter there are in two but nine, and in the third ten scales, in an oblique row beneath the lateral line. The colours of the fresh fish are as follows:—upper part of head green, becoming gradually more tinged with blue towards the snout; cheeks and opercles olive; mandibular region pale violet; chin sky-blue; edge of the maxillary lip with a narrow outer golden and inner blue stripe; anterior margin of the preorbital very narrowly edged with blue; an oval sky-blue spot in front of the orbit, and extending to about one third of its diameter. Body olive-brown above the lateral line, rose-coloured below, most of the scales on the back and caudal peduncle with a medium-sized, round, blue spot; a broad dark band runs from the fifth scale of the lateral line forwards and downwards in an arcuate shape to the inferior margin of the opercle. Dorsal fin golden, the spinous portion with a basal, median, and marginal band of blue, the two outer of which are exchanged on the rays for wavy, anastomosing lines of the same shade; anal fin grey, with a broad basal and marginal blue band, bordered on the inner edge by a narrower golden stripe; ventrals bluish, the membrane between the first and second rays golden; pectorals grey, with two transverse golden bands in front of the base, and the two outer rays and basal third of the others blue; caudal brownish, with the outer rays blue, and the bases of the remainder green. Irides golden and crimson, with sky-blue marginal spots.

Count Castlenau's *Torresia australis*, of which the type is unfortunately missing, is probably the young of *Chærops ommopterus*.

P.S. (Dec. 22, 1888).—Since writing the above I have received another large specimen from the same locality, which agrees exactly in coloration with those here described.

<sup>1</sup> From Dr. Günther's description (Ann. Nat. Hist. [4] xvii. 1876, p. 395) it appears to me that this fish has quite as good a claim to separate generic rank as many other Carangoids the right of which has never been questioned.

<sup>2</sup> *Platystethus abbreviatus*, Hector (Trans. N. Zealand Inst. vii. 1875, p. 247, pl. xi. f. 31 C), is a *Cyttus*.